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at any angle ; secondly, to the case in which they are equally inclined on either side of the vertical ; thirdly, to the case in which one is horizontal and the other vertical ; and, fourthly, to that in which both are horizontal. He concludes his paper by a deduction from this last case of the modulus of a system of any number of pulleys or sheaves, sustaining among them the weight of any given length of rope horizontally.

3. "On the Nervous Ganglia of the Uterus." By Robert Lee, M.D., F.R.S.

The author, in a paper which was read to the Royal Society on the 12th of December, 1839, had described four great plexuses under the peritoneum of the gravid uterus, having an extensive connexion with the hypogastric and spermatic nerves. From their form, colour, general distribution, and resemblance to ganglionic plexuses of nerves, and from their branches actually coalescing with those of the hypogastric and spermatic nerves, he was induced to believe, on first discovering them, that they were ganglionic nervous plexuses, and that they constituted the special nervous system of the uterus. He states in the present paper, that subsequent dissections of the unimpregnated uterus, and of the gravid uterus in the third, fourth, sixth, seventh, and ninth months of pregnancy, have enabled him not only to confirm the accuracy of his former observations, but also to discover the important fact, that there are many large ganglia on the uterine nerves, and on those of the vagina and bladder, which enlarge with the coats, blood-vessels, nerves, and absorbents of the uterus during pregnancy, and which return, after parturition, to their original condition before conception took place. The author next proceeds to describe the two great ganglia situated on the sides of the neck of the uterus, in which the hypogastric and several of the sacral nerves terminate, and which he calls the *hypogastric, or uterocervical ganglia*. In the unimpregnated state, they are of an irregular, triangular, or oblong shape, about half an inch in the long diameter, and always consist of grey and white matter, like other ganglia. They are covered by the trunks of the vaginal and vesical arteries and veins ; and each ganglion has an artery of considerable size, which enters it near the centre and divides into branches, accompanying the nerves given off from its anterior and inferior borders. From the inner and posterior surface of each of these ganglia, nerves pass off, which anastomose with the haemorrhoidal nerves, and ramify on the sides of the vagina, and between the vagina and rectum. From the inferior border of each hypogastric ganglion several fasciculi of nerves are given off, which pass down on the sides of the vagina, and enter some large flat ganglia, midway between the os uteri and ostium vaginae. From these vaginal ganglia innumerable filaments of nerves, on which small flat ganglia are formed, extend to the sphincter, where they are lost in a white dense membranous expansion. From this great web of ganglia and nerves numerous branches are sent to the sides of the bladder, and enter it around the ureter. All these nerves of the vagina are accompanied with arte-

ries; and they often form complete rings of nerve around the trunks of the great veins.

The author then describes the nerves which are given off from the anterior margin of each hypogastric ganglion, some of which pass on the outside of the ureter, and others on the inside, and meet in front of the ureter in a ganglion, which he calls the *middle vesical ganglion*. There are other two ganglia, he states, formed on these nerves; one between the uterus and ureter, and the other between the ureter and vagina. These he calls the *internal and external vesical ganglia*. Not only is the ureter inclosed within a great ring of nervous matter, which, he says, resembles the œsophageal ganglia in some of the invertebrata; but the trunks of the uterine artery and vein are likewise encircled by a great collar of nervous matter, between which and the hypogastric ganglion several large and some small branches pass.

The author gives the following description of the vesical ganglia. The internal vesical ganglion, which usually has a flattened or long bulbous shape, is formed entirely upon the nerves which pass from the hypogastric ganglion, and run between the uterus and the ureter. It has an artery which passes through its centre. It first gives off a large branch to the ring of nerve or ganglion which surrounds the uterine blood-vessels; it then sends branches to the anterior part of the cervix uteri, and afterwards a great number of small filaments to the muscular coat of the bladder behind, where it is in contact with the uterus; and it then sends forwards a large branch, which terminates in the middle vesical ganglion. This ganglion sends off a great number of large nerves to the bladder. Some of these accompany the arteries, and can be seen ramifying with them upon the whole of the superior part of the organ, even to the fundus. Filaments of these nerves, scarcely visible to the naked eye, are seen in one of the preparations ramifying upon the bundles of muscular fibres, occasionally forming loops and inclosing them, or passing down between them to the strata of fibres below. Some of the smaller branches of the middle vesical ganglion do not accompany the arteries, but are distributed at once to the parts of the bladder around the ureter.

The external vesical ganglion is formed entirely upon the nerves which proceed from the hypogastric ganglion, and pass on the outside of the ureter. This is a small thin ganglion, the branches of which are sent immediately into the muscular coat of the bladder. It usually sends down a long branch to anastomose with the nerves issuing from one of the vaginal ganglia.

From the inner surface of each hypogastric ganglion numerous small white, soft, nerves pass to the uterus, some of which ramify upon the muscular coat about the cervix, and others spread out under the peritoneum to coalesce with the great ganglia and plexuses situated on the posterior and anterior surfaces of that organ. Large branches also go off from the inner surface of the ganglion to the nerves surrounding the blood-vessels of the uterus, which they accompany in all their ramifications throughout its muscular coat.

This paper is illustrated by two drawings, in which the hypoga-

tric, vaginal, vesical and uterine ganglia are delineated in the fourth month of pregnancy, and also the plexuses of nerves on the anterior surface of the uterus.

From an examination with the microscope of portions of the plexuses under the peritoneum of a gravid uterus in the ninth month, which had long been immersed in rectified spirit, Professor Owen and Mr. Kiernan inferred that they were not nervous plexuses, but bands of elastic tissue, gelatinous tissue, or cellular membrane.

The author concludes his paper with a letter from John Dalrymple, Esq., containing the results of the observations he had made with the microscope on the uterine nerves in the recent state. Filaments of the nerves which surrounded the ureter, and which were situated upon the body of the uterus, were submitted to the microscope. The instrument employed was a very powerful object-glass, whose focus was the eighth of an inch, made by Ross. Mr. Dalrymple found that it was impossible, even with the most careful dissection, to detach any filament of nerve without including a quantity of cellular and elastic tissue; so that although the tubular portion indicating the nerve was distinct, yet it was surrounded by innumerable extremely minute threads coiled and contorted, such as those which constitute the component of elastic tissue, and the ultimate element of cellular membrane. Under slight pressure, however, the tube was plainly discernible, and was found to contain granular matter, not uniformly distributed, but collected in minute masses at intervals. Small blood-vessels were also here and there seen, with blood-discs within them, which served to indicate the difference between the nervous and vascular tubes, and thus to avoid the possibility of error. Being, however, aware that some of the most distinguished foreign microscopical anatomists had differed as to what was the real characteristic of the nerves of the sympathetic system, and feeling, from this discordance of opinion, that there was no absolute test, or at least none which was not open to cavil, Mr. Dalrymple thought of making a comparison of the uterine nerves with those that undeniably belonged to the ganglionic system. He therefore traced some nerves on the surface of the stomach up to the great ganglion that gave them origin; and he selected some also from the small intestine. These he submitted to the same microscopical power, and under the same circumstances of light, and pressure, and medium. In all of these he observed the tubular part filled with granular matter, and similarly collected in minute masses. He also observed that each tube was surrounded by the minute serpentine threads before described. In fact, so closely did they agree in every particular with the appearances presented by the uterine nerves, that it would have been impossible to distinguish the one from the other.

4. "On the Corpuscles of the Blood." Part III. By Martin Barry, M.D., F.R.SS. L. and E.

After remarking that no clear conception has hitherto existed of the mode in which the floating corpuscles of the blood conduce to nourishment, the author states that he has found every structure he has